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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,417	03/02/2004	John Zhiqiang Wang	19441.0071	2416

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EXAMINER

NGUYEN, NINH H

ART UNIT PAPER NUMBER

3745

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/708,417

Applicant(s)

WANG ET AL.

Examiner

Ninh H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-12 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 13-15 and 17 is/are rejected.
- 7) ☒ Claim(s) 5 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 03/02/04, 03/12/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozlin (4,589,824) in view of Jackson et al. (5,026,522) and Andersen et al. (3,982,851).

Kozlin discloses a turbine blade 10 comprises a tip cap 28, the tip cap being made of a sheet metal with a thickness of 0.050 inches (col. 4, lines 34-40).

However, Kozlin does not disclose the tip cap 28 being made of HS-188 sheet metal, and the tip cap does not have a plurality of holes positioned in the sheet metal as claimed.

Jackson teaches HS-188 sheet metal is a well known material to be used in high temperature applications (co. 4, lines 28-32).

Andersen teaches a turbine blade 11 (Figs. 1-6) comprising an airfoil having a plurality of internal cavities 26 and a tip cap 36 having a plurality of cooling holes 41 in communication with the internal cavities to facilitate blade tip cooling (col. 2, lines 59-63).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the turbine blade of Kozlin with the tip cap made of HS-188 sheet metal as an expedience to provide a turbine blade tip cap which can withstand high temperature operations as taught by Jackson, and to form a plurality of cooling holes in the tip cap for the purpose of cooling the turbine blade tip as taught by Andersen.

Regarding claims 2 and 3 Kozlin in view of Jackson and Andersen discloses all the limitations except the plurality of holes does not comprises six holes, and the diameter of the cooling holes is not about 0.04 inches as claimed.

Since the applicant has not disclosed that having the plurality of holes comprises six holes and the diameter of the cooling holes is about 0.04 inches solves any stated problem or is for any particular purpose above the fact that the number of cooling holes and the diameter of the cooling hole affect the cooling of the turbine blade tip and it appears that the modified tip cap of Kozlin would perform equally well with the number of holes and hole diameter as defined claimed by applicant, it would have been an obvious matter of design choice to modify the modified turbine tip cap of Kozlin by utilizing the specific number of holes and hole diameter as claimed.

Regarding claim 4, Kozlin in view of Jackson and Andersen discloses all the limitations except the thickness of the sheet metal is not about 0.062 inches as claimed.

It is well known that the thickness of a metal is closely relate to its elastic strength and thermal conductivity. Therefore, the thickness is a result effective variable in the design of a turbine tip cap.

Since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to make a turbine blade of Kozlin with a tip cap thick ness of about 0.062 inches to provide sufficient strength to withstand the centrifugal forces during turbine operation. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

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Regarding claim 6, Kozlin in view of Jackson and Andersen discloses all the limitations except the tip cap is not electron beam welded to the turbine airfoil as claimed.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to electron beam weld the tip cap to the turbine airfoil as an expedience to fixedly attach the tip cap to the airfoil.

3. Claims 13-15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kozlin in view of Andersen et al.

Kozlin discloses a turbine blade comprising an airfoil, a sheet metal tip cap position about a first end of the airfoil, wherein the thickness of the sheet metal is about 0.050 inches.

However, Kozlin does not disclose the tip cap comprising six holes and the diameter of the holes is about 0.04 inches as claimed.

Andersen teaches a turbine blade 11 (Figs. 1-6) comprising an airfoil having a plurality of internal cavities 26 and a tip cap 36 having a plurality of cooling holes 41 in communication with the internal cavities to facilitate blade tip cooling (col. 2, lines 59-63).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the turbine blade of Kozlin with a plurality of cooling holes in the tip cap for the purpose of cooling the turbine blade tip as taught by Andersen.

Further, since the applicant has not disclosed that having the tip cap comprising six holes and the diameter of the cooling holes is about 0.04 inches solves any stated problem or is for any particular purpose above the fact that the number of cooling holes and the diameter of the cooling hole affect the cooling of the turbine blade tip and it appears that the modified tip cap of

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Kozlin would perform equally well with the number of holes and hole diameter as defined claimed by applicant, it would have been an obvious matter of design choice to modify the modified turbine tip cap of Kozlin by utilizing the specific number of holes and hole diameter as claimed.

Regarding claim 15, Kozlin in view of Andersen discloses all the limitations except the thickness of the sheet metal is not about 0.062 inches as claimed.

It is well known that the thickness of a metal is closely related to its elastic strength and thermal conductivity. Therefore, the thickness is a result effective variable in the design of a turbine tip cap.

Since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to make a turbine blade of Kozlin with a tip cap thickness of about 0.062 inches to provide sufficient strength to withstand the centrifugal forces during turbine operation. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 17, Kozlin in view of Andersen discloses all the limitations except the tip cap is not electron beam welded to the turbine airfoil as claimed.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to electron beam weld the tip cap to the turbine airfoil as an expedience to fixedly attach the tip cap to the airfoil.

***Allowable Subject Matter***

4. Claims 7-12, due to the limitation of specific coordinate of the holes, are allowed.

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5. Claims 5 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Prior Art***

The prior art made of record but not relied upon is considered pertinent to applicant's disclosure and consists of 1 patent.

Allen et al. (4,073,599) is cited to show a sheet metal turbine blade tip cap having a plurality of cooling holes.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Ninh Nguyen whose telephone number is (571) 272-4823. The examiner can be normally reached on Monday-Friday from 7:30 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached at (571) 272-4820. The fax number for this group is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, please go to <http://pair-direct.uspto.gov> or contact the Electronic Business center (EBC) at 866-217-9197 (toll-free).

  
NINH H. NGUYEN  
PRIMARY EXAMINER

Nhn  
July 14, 2005